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REPORT

CD NO.

COUNTRY	USSR	DATE OF INFORMATION	1949
SUBJECT	Scientific - Radio-wave propagation		
HOW PUBLISHED	Monthly periodical	DATE DIST.	28 Feb 1950
WHERE PUBLISHED	USSR	NO. OF PAGES	1
DATE PUBLISHED	Nov 1949	SUPPLEMENT TO REPORT NO.	
LANGUAGE	Russian		

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SOURCE Vestnik Akademii Nauk SSSR, No 11, 1949.

THE PROBLEM OF WAVE PROPAGATION IN LAMINAR MEDIA

Among the papers presented at the session of the Department of Physico-mathematical Sciences held on 26 September at the Moscow Order of Lenin State University imeni V. M. Molotov was "A New Method of Solving the Problem of the Field of a Point Radiator in a Laminar-Nonhomogeneous Medium" by L. M. Brekhovskikh, Doctor of Physicomathematical Sciences. A summary of his presentation follows:

The problem of wave propagation in laminar media arises in the study of the propagation of sound or radio waves in the atmosphere or sea, where the properties vary with depth. In both cases the nonhomogeniety of media causes the formation of so-called wave guides in the atmosphere or sea, by which energy can be transmitted thousands of miles. In his new method of solving the problem of wave propagation in such media, Brekhovskikh resolves spherical waves into plane waves and then studies the behavior of each of the plane waves separately. He finds the coefficient of reflection of plane waves from a laminar medium without use of the wave equation. The solution of the coefficient involves the Ricatti equation, solvable by successive approximations. Brekhovskikh represents the radiator in the form of an integral of a certain path in a complex plane of angles which characterize the direction of propagation of the plane waves. This integral is analyzed according to well-known methods in the theory of complex variables.

As a result, the sound potential of acoustics or the vertical component vector of Hertz in the electromagnetic case are given by a collection of waves, each propagating itself with its own velocity (discrete spectrum), and by two lateral waves. The damping and speed of propagation of these waves in the discrete spectrum are then determined. These lateral waves play an important role at great distances.

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